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University Culture and Sustainability: Designing and Implementing an Enabling Framework

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ABSTRACT

Universities across the globe are giving increasing priority to the challenges of sustainability, encouraged by a variety of drivers including international and national policy, student and societal pressures. Many extant initiatives focus on a relatively narrow set of activities including: Technological solutions; Integrating sustainability across the curriculum; Integrating sustainability as an operational, strategic and outreach principle. These have met with mixed success, and have overlooked the importance of cultural change in embedding sustainability. Drawing and building upon previous studies in the cultural change and sustainability literature, the purpose of this article is to propose a conceptual framework for designing interventions and measuring and monitoring progress in building and embedding a university sustainability culture. Initial staff and student survey data from a UK university has been applied to the framework and their interpretation and implications are explored.

KEYWORDS

University sustainability; Organizational culture; Environmental accountability; Wicked problem

1. INTRODUCTION

Universities and Higher Education Institutes (HEIs) have been amongst the earliest signatories to sustainability declarations, beginning in 1972 with the Stockholm Declaration on the Human Environment and later the Talloires Declaration (UNESCO, 1990), the first statement by university administrators of a commitment to sustainability in higher education (Wright 2002). As of January 2016, the Declaration had been signed by 499 university presidents and chancellors at institutions in 54 countries[1]. The American College & University Presidents Climate Commitment[2] has in excess of 650 members and the Association for the Advancement of Sustainability and Higher Education[3] over 750. The Higher Education Sustainability Initiative (HESI) was created as a partnership of United Nations entities in the run-up to the UN's Conference on Sustainable Development (Rio+20). With a global membership of almost 300 universities, HESI accounts for more than one-third of all the voluntary commitments that came out of Rio +20.

In recent decades, then, many universities and HEIs have aligned themselves to the principles of sustainability. The role that universities have to play in the transformation toward a more sustainable society is attested to in both the scholarly and practitioner literature (Trencher, Bai, Evans *et al.*, 2014; Ramos, Caeiro, van Hoof *et al.,* 2015). Typically, their sustainability-related initiatives consist of academic, operational and wider stakeholder outreach activities (Luna and Maxey 2013; Shiel, Filho, do Paço *et al*., 2016), For example, there has been considerable effort expended in: the re-design of curricula (Beusch, 2014; Martin, McCoshan & McEwen, 2014); in greening campuses (Brinkhurst, Rose, Maurice *et al.*, 2011; ISCN Secretariat, 2014); and, building local, regional and international networks to influence behaviour (Arbo and Benneworth, 2007; Bansal, Bertels, Ewart *et al.*, 2012). At the same time, universities have been exploring and developing the means to integrate and embed enduring sustainability thinking. Efforts have included such initiatives as: establishing institutional guidelines and frameworks; reifying sustainability as the lived on-campus life experience (e.g. campus as a living lab); and, maintaining programmes of sustainability audits for example using the Auditing Instrument for Sustainability in Higher Education (Shriberg 2002; Wright, 2007; McCoshan and Martin 2013; Marans, Callewaert & Shriberg, 2015; Lozano, Lukman, Lozano *et al*., 2013).

Notwithstanding such activity, progress has been criticised for being technologically opportunistic and lacking overall coordination, leadership and coherence (Ramos *et al*., 2015; ISCN Secretariat 2014; Butt, More, & Avery 2014; Martin, Dillon, Higgins, *et al*., 2013), leaving some of the bigger questions relating to sustainability, such as the social dimension, unaddressed (Bone and Agombar, 2011) and, notably, a lack of enduring effects (Cotton and Alcock, 2013).

It is clear that the "embedding of sustainability in higher education has been far from straightforward…[and that]… that implementation has been patchy – both in terms of disciplinary spread and in terms of the understandings of sustainability" (Cotton and Alcock, 2013: 1458). A culture for sustainability can be thought of as "one in which organizational members hold shared assumptions and beliefs about the importance of balancing economic efficiency, social equity and environmental accountability" (Bertels, Papania & Papania, 2010: 10), and the failure to embed sustainability in HEIs suggests it has failed to become part of the culture.

This observation finds support from UNESCO's (2006: 3) call "to integrate the values inherent in sustainable development **into all aspects of learning**" (*authors' emphasis*), and Trencher *et al*'s (2014) that most barriers to university partnerships for urban sustainability are human rather than technical. If universities and HEIs are to deliver on their promise of providing tomorrow's leaders,

[1] Source: Association of University Leaders for a Sustainable Future http://www.ulsf.org/programs_talloires_signatories.html#UK, June 2016

[2] http://secondnature.org/

[3] http://www.aashe.org/.

managers, scientists and teachers with the knowledge and cognitive skills to address the challenges of sustainability, then these shortcomings need to be addressed.

The purpose of this article is to address this gap by proposing and piloting a conceptual framework to guide the development, implementation and monitoring of a university culture for sustainability reflecting diverse stakeholder communities, including: students, staff (academic), staff (non-teaching) and, stakeholder businesses in the local community. The article begins by briefly locating the challenge of sustainable culture as a 'wicked problem' (Churchman 1967). Following that, two streams of literature, organizational culture and sustainable transformation are reviewed and integrated for the purpose of proposing a conceptual framework to help monitor and accelerate embedding a culture for sustainability. Next, the framework is applied in the context of the case of University of Worcester's sustainability journey, and draws comparisons to others' efforts in the field. The article concludes with a discussion of next steps and reflections on implications for theory and practice. Consequently, this article is about 'becoming' sustainable and, as such, marks a departure in the HEI/Sustainability literature which, to date, has tended to focus on HEIs as change agents, sustainability pedagogy and campus-based, incremental, technological innovation for resource efficiency and optimization, and so raises important debate regarding embedding change holistically within HEI culture.

2. UNIVERSITY SUSTAINABILITY CULTURE AS A WICKED PROBLEM

The whole notion of sustainability is inherently complex, made so through the integration of three high level considerations - people, planet, profit (Elkington 1997) – and long-time horizons with hard to quantify impacts (Epstein and Roy 2001). The journey towards sustainability is mired in this complexity and so characteristically a 'wicked problem' - wicked in the sense of often being ill-formulated, cutting across boundaries, being highly resistant to resolution, constituted by multiple agents and decision makers with conflicting values, and with ramifications for the whole system (Churchman 1967). Becoming sustainable is, consequently, a challenging problem in terms of communicating and controlling its characteristic values, behaviours and attributes to guide actor and institutional behaviour (Martin and Murray 2011). On these grounds, there are several reasons why a university's journey to sustainability can be thought of as a wicked problem, as summarised in Table 1.

Table 1: The wicked problems of universities' transitions to sustainability

Problem	Description	Illustrative literature
Complex network of internal and external stakeholders	Diverse areas of activity are involved in universities' transitions to sustainability, including: learning and teaching, operations, external engagement and research, as well as what is done and how it is done. Cuts across social, economic and organizational boundaries and involves multiple agents many of whom are accustomed to high levels of autonomy. The complexity is such that universities are frequently likened to small cities, where decisions have long-lasting and wide-scale ramifications.	Alshuwaikhat and Abubakar (2008); Hoover and Harder (2014)
Evaluating impact	Cost-benefit calculations are highly complex: for example, how can a university's impact on living and non-living natural systems and on social systems be measured, and over what time frame? Further, the challenge of changing 'ecological world views' through educative processes should not be under-estimated, particularly as what constitutes requisite sustainability competencies remains unclear.	Barth *et al.* (2016); Corcoran, Weakland and Wals, (2017); Lukman and Glavič (2007); Richardson and Lynes (2007)

Systemic approaches required	Lengthening the glide path through incremental innovation (i.e. squeezing more from limited resources) is an insufficient solution; more systemic approaches are required.	Adams, Jeanrenaud, Bessant *et al*. (2016).
Role of universities	What is the 'system' and what is a university's place within that system? Do universities ignite, accelerate or block change?	Brennan, King & Lebeau (2004)
Legacy issues	Transitions to sustainability rendered challenging due to incumbents historically running unsustainably and so constrained by legacy of organizational culture and may require of institutions new generations of governance approaches orientated to the long-term.	Hoover and Harder (2014); Hamann and April (2013)
Contested evidence base	Can consensus of need for and direction of action be expected in a context where there remains some (though diminishing) contestation over the evidence base	Whitmarsh (2011)

As noted above, a number of universities have publicly declared their intent by committing to initiatives like the Talloires Declaration (UNESCO, 1990), in which university leaders mobilise internal and external resources toward the objective of incorporating sustainability and environmental literacy in operations/strategy and outreach as well as in teaching and research (Wright 2002).

Typically, approaches to the challenge in the university context have been described (ISCN Secretariat 2014) as:

- Technological solutions to sustainability challenges
- Integrating sustainability subject matters across the curriculum
- Integrating sustainability as a core strategic principle across the campus

Reflecting on these efforts, and evaluating the progress of sustainability in higher education, the scholarly literature has noted a predominant focus on technological and operational activities and relatively little attention to strategic and reflexive activities. Further, the literature is characterised by a focus on descriptive studies of specific initiatives, and a preponderance of prescriptive studies that often call on universities to play a more prominent role (e.g. Stephens and Graham, 2010).

Technological solutions have been developed and applied principally in the area that has become known as 'campus greening' (Shriberg and Tallent, 2003; Finlay and Massey, 2012). The idea of the sustainable campus has taken hold in universities across the globe and is reflected in a range of initiatives that include the International Sustainable Campus Network[4], University of Maryland's Smart and Sustainable Campus Conference[5], the Association for the Advancement of Sustainability and Higher Education[6], and the Sustainable Campus International Competition[7]. These initiatives have been successful in raising the challenge across a global audience, acting as living laboratories to design and test innovative technologies and approaches, and in providing a virtuous circle connecting teaching, research and practice. Technological solutions include initiatives such as the design of smart buildings[8] (McGibbon, Ophoff & Van Belle, 2015), investing in recycling programmes (Kaplowitz, Yeboah, Thorp *et al.*, 2009) and the promotion of energy saving technology (AASHE, 2014).

[4] http://www.international-sustainable-campus-network.org/
[5] http://sustainability.umd.edu/content/community/SSCC.php
[6] http://www.aashe.org/.
[7] http://sustainablecampusic.com/
[8] for example, LEED (Leadership in Energy and Environmental Design) provides certification pathways structured for organizations seeking certification for multiple buildings such as university campuses. See http://www.usgbc.org/leed

Although scholarship acknowledges the contribution technological advances have made to helping move toward a sustainable world, for example in terms of maximising material and energy efficiency (Bocken, Short, Rana *et al*., 2014), technical solutions alone are not enough. The effects of these initiatives are not being felt either as strongly or quickly as hoped for at their conception, and have been less impactful than designed for in helping universities reach sustainability (Cotton and Alcock, 2013; McCoshan and Martin, 2013). Alongside these, behaviour and systems level change are needed (Adams *et al*., 2016; Ramos *et al*., 2015). OECD (2009), too, emphasise the need to move beyond the technical to issues of behaviour and culture, implying that the sustainable organization will remain elusive until, at least, sustainability becomes embedded within the culture of the organization. The agenda has therefore advanced to consider the university more holistically in terms of its transformation and to embed sustainability more deeply into the its structures, processes, practices and culture.

Change models for sustainability in HEIs have been limited in their scope and narrow in their vision. Velazquez, Munguia, Platt *et al*'s (2006) conceptualisation and model of the sustainable university goes further than most. It comprises of a four-phase process that moves from strategic to operational activity:

- Phase one: developing a sustainability vision for the university
- Phase two: the mission, the who, what, and why for future actions
- Phase three: enact a sustainability committee to create policies, targets, and objectives
- Phase four: sustainability strategies in four domains of activity, including education, research, outreach and partnership and campus sustainability

Despite its apparent holism, that it can act as a framework for integrating sustainability within institutions as well as in terms of relations with external stakeholders and the wider community, this model is limited. In particular, it would appear to represent a very top down formulation and so contradict the prescriptions of scholars such as Lozano (2006) and Verhulst and Lambrechts (2014) who commend strategies that include bottom-up approaches. Further, it overlooks the important dimension of culture whose important role in change management and transformation initiatives is well established (Armenakis, Brown & Mehta, 2011).

If universities and HEIs are to fulfil their potential role as exemplary organizations, as technical, cognitive and cultural role models of sustainability for this and the next generation's students and leaders as well as into the wider stakeholder community they need to "undergo significant cultural change and transformation" (Linnenluecke and Griffiths 2010: 357) which implies a change of attitude and developing a new set of values and behaviours: in short, an organizational culture for sustainability.

In the following sections, a framework for university sustainability culture is proposed and subsequently reflectively applied on the University of Worcester's continuing journey to sustainability.

3. CONCEPTUALISING A UNIVERSITY CULTURE OF SUSTAINABILITY

3.1 SUSTAINABILITY

Organizational sustainability is a recently emergent concept that integrates a diversity of intellectual and pragmatic influences. Some scholars have traced its roots back to the socially-informed practices of industrial dynasties most famously, at least in the UK, including the Bourneville and Cadbury families (Lamming, Faruk, & Cousins 1999; Smith 2003), and, in the USA, to include the likes of Henry Ford (Diamond 2005). In the context of Victorian England, the work of Sir Titus Salt has become recognised as a contemporary exemplar. Having amassed a fortune from weaving together alpaca wool with a silk or cotton warp to create a cloth of the finest quality, Salt moved his mill and workers out of Bradford (then, the most polluted town in England) to build a new industrial community, the

eponymous town of Saltaire. Salt built 850 houses for his workers, each served with fresh water from Saltaire's own reservoir. He also built shops, schools and Sunday schools, baths, washhouses, almshouses, a club and institute, a Wesleyan chapel, a magnificent Congregational church and a park (Ingham, 2006).

More recent influences include Osborn's (1948) *Our Plundered Planet*, Carson's (1962) *Silent Spring,* The World Commission on Environment and Development's *Our Common Future* (WCED 1987) as well as studies of anthropogenic influence purported to threaten the stability of planetary boundaries (Rockström, Steffen, Noone *et al*., 2009) that support the ecosystem services on which the world's population depends to survive and thrive (Costanza, d'Arge, de Groot *et al*., 1997) and on persistent social injustice and inequality (Raworth 2012). There are multiple definitions of sustainability, but the idea of sustainable development as defined in the Brundtland report (WCED, 1987) – "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" – (and variations of it) is commonly adopted as is Elkington's (1997) conceptualisation of the *Triple Bottom Line* in which organizations are exhorted to adopt a responsible approach and give equivalence to environmental, social and economic dimensions in decision-making.

However, many scholars have argued that becoming and being a sustainable organization is not a singular 'before and after' event, rather it is a process of transformation that takes place over time. Frequently, the journey metaphor has been invoked to describe this (Mohrman and Worley 2010). With exceptions - for example Verhulst and Lambrechts (2014) who describe the integration of sustainable development at KHLeuven as happening in four stages, starting with a bottom-up approach characterised by local micro-initiatives, gradually becoming more prominent and inclusive through the university and moving toward embedding sustainability vision, strategy and behaviour throughout the university - the journey or transformation perspective is not well reflected in the HEI/Sustainability literature. However, the organizational sustainability literature provides some useful models from which lessons to inform framework development can be drawn.

For organizations that want to become and be sustainable, a dynamic model is required, one that portrays change taking place over time (see Kolk and Mauser (2002) for a review), from Hunt and Auster's (1990) five stages of environmental management (Beginner; Firefighter; Concerned Citizen; Pragmatist; Pro-activist) to, more recently, Adams *et al*'s (2016) transformatory model of three contexts of the sustainability journey (Operational Optimization; Organizational Transformation; Systems Building), the latter resulting from the synthetic processes of systematic review.

In this article, sustainability is conceived as a journey recognisable as a set of transformatory stages in which the behaviour and attitudes of groups of people within an organization become increasingly aligned around and consistent with the principles embodied in and implied by sustainable development. The culture of an organization provides a sense of identity, it is central to the sense of 'who we are as an organization' and makes consistent and coherent organizational action possible (Jacobs *et al.*, 2013). Drawing on Adams *et al*'s (2016) sustainability journey framework provides the means to map progress longitudinally (Box 1).

3.2 ORGANIZATIONAL CULTURE

Organizational culture is a well-established, influential and, sometimes, controversial concept in management research and practice. The notion of 'culture' as applied to organizations originates in the fields of anthropology and sociology, where there exist various interpretations of its meaning as there do in management and organization studies (Smircich 1983; Tierney 1988). Although variously conceptualised, culture is generally taken to reflect the idea that groups of people – in assemblages of different size – share, in common, a specific set of ideas, norms, values, beliefs and understandings and that these become manifest in and are reinforced by and in the routines, practices, symbols and stories of their community. These manifestations are more or less observable at different 'layers' of the group or organization and, importantly, govern the way in which people

and the group/organization work. Organizational cultures provide a sense of identity, 'who we are', and are also a representation of behaviour and practice 'how things get done around here'. The link between behaviour and culture appears to be reciprocal, each reinforcing and shaping the other (Schneider and Barbera 2014; Bertels, Papania, and Papania 2010).

Box 1: Three contexts of the sustainability journey (after Adams *et al*. (2016))

Operational Optimization: an internally oriented perspective on sustainability, referring to guiding a set of values described as a 'doing the same things but better' approach in which there is a focus on efficiency and compliance with regulation. Typically, technical solutions applied incrementally and in isolation, are the favoured solution to sustainability challenges.

Organizational Transformation: represents a fundamental shift in mind-set in the organization, a shift in values from 'doing less harm' to creating shared value and delivering wider benefits for society by 'doing good by doing new things'. The context is characterized by a redefinition of internal and external relationships that increasingly are conceived in terms of environmental and social impacts. Typically, activities are more people oriented in that they engage with behaviours and attitudes, more deeply integrate sustainability within the organization and are less insular. It remains largely internally oriented, suffusing and diffusing sustainability throughout the organization, but extends to immediate stakeholders too. Sustainability moves beyond compliance and efficiency-motivated initiatives to become embedded in organizational DNA.

Systems Building: extends the notion of sustainability beyond the boundaries of the organization and reflects a radical shift in philosophy and values to thinking beyond the firm and reframing the purpose of organization in society, as 'doing good by doing new things with others'. A key feature is that sustainability cannot logically be thought of as an attribute of a single organization, but can only properly be applied at the systems level which puts external linkages at its core. The context is characterized by a shift toward networks of relations in which sustainability value is created collaboratively rather than individually and firms shift from existing in isolation and in competition to integrated collaborations, with the potential to bring systems-shaping change In terms of sustainability, it can be seen as the 'set of actions that shift a system – a city, a sector, an economy – onto a more sustainable path'.

Schein (1985, 9) defines organizational culture as "*a pattern of basic assumptions—invented, discovered, or developed by a given group as it learns to cope with its problems of external adaptation and internal integration—that has worked well enough to be considered…the correct way to perceive, think, and feel in relation to those problems*." In other words, organizational culture is a collection of values and norms that are shared by people in an organization which governs members' behaviours and actions in pursuit of organizational goals. It is clear then, with behaviours and actions on the one hand and values on the other, that the notion of culture challenges the researcher and change agent to consider tangible, overt as well as less visible instantiations of the phenomenon.

3.2.1 Visible and invisible culture

Schein (1997) described three levels of culture: artefacts; espoused values; and, assumptions. These range from overt outward manifestations to deep underlying taken-for-granted, invisible elements that drive organizational action. Schein is not unique in decomposing culture into the visible and invisible, but many scholars favour a simple dichotomy.

For example, Kotter and Heskett (2011) recognise two levels which differ in their visibility and, as a result, their proclivity to change efforts, as does Wilson (2001). The visible level of culture includes group behaviours and actions, which are more observable and easier to measure and change. The invisible level is made up of shared values that tend to persist over time and are self-evidently less visible and so less amenable to change. The latter are the result of the continuing enactment of the

former. Consequently, the process of changing the deeply-seated, implicit beliefs and assumptions that govern action takes place slowly and through the manipulation of visible factors: for example, changing a mission statement or reward structures. Both levels of culture are relevant to conceptions of sustainability culture. Organizations looking to build sustainability values into their culture embark on what can be a slow process of ideological transformation in which the underlying assumptions of behaviour are recalibrated through changes to what Linnenluecke, Russell & Griffiths (2009: 435) describe as 'the observable culture', the visible organizational structure, processes and behaviours (Kagan 2014; Crittenden, Crittenden, Ferrell *et al.,* 2011). That is, over time, change in the visible layer can lead to change in the invisible layer (Kotter and Heskett 2011). The more visible the cultural artefacts, the easier they are to change and the less visible the culture the more resistant the culture is to change, but it is in the less visible aspects that culture is truly embedded.

3.2.2 Single and multiple cultures

In addition to visible and invisible elements, some researchers have argued that within a single organization multiple sub-cultures can co-exist (e.g. Linnenluecke, Russell, and Griffiths 2009; Schein 1985). These may be occupationally-, geographically-, hierarchically- or functionally-based. Clark (1983), for example, proposed three levels of culture in higher education: the culture of the discipline, the culture of the enterprise, and the culture of the academic profession and/or national system.

At the organizational level, universities share some similarities with other complex organizations such as companies, government entities, and non-governmental organizations such as being structured with managers and employees (Stephens and Graham, 2010). However, the tradition of academic freedom and the relatively short-term, repeating turnover of students can give rise to these people feeling less invested in institutional culture.

Our focus is at the organizational level within which some researchers are divided as to whether or not multiple sub-cultures aggregate into a coherent, single culture. Schein (1985) argues that if the organization has a significant shared history, then it will have an overall culture. Conversely, and in a study specifically of the university sector, Silver (2003), echoing Cohen, March & Olsen 's (1972) notion of 'organized anarchy', argues that universities do not have 'a' culture but are better characterised by conflict and lack of coherence. Others describe this more benignly as 'academic culture', one that is characterised by high levels of individual autonomy in teaching and research (Dill, 2012).

On this basis, multiple sub-cultures can be anticipated to co-exist within an HEI each potentially holding different attitudes and orientations toward sustainability which are distinct from those of other sub-cultures. Within universities (Tierney 1988) cultural influences occur at many levels, within departments, across categories of employee, between staff and students. The framework will focus on student, academic, non-teaching and external stakeholder sub-cultures. Levy and Marans (2012) led an interdisciplinary team that developed recommendations grounded in education, assessment and monitoring among students, faculty and staff for building a culture of environmental sustainability on the campus at the University of Michigan. At the University of Guelph in Canada, Brinkhurst *et al*. (2011) explored the role of leadership for environmental sustainability. In particular they focused on leadership roles of the institutional "middle", faculty and staff, finding intrapreneurial behaviour within this cohort significantly contributing to reaching sustainability objectives, but under-celebrated and under-acknowledged.

Our multiple stakeholder approach, in contrast to previous studies that have focused on academic disciplines (Clark 1983), or tribes (Becher and Trowler 2001), recognises students, teaching faculty, non-teaching staff and external organizational partners as important stakeholders. In recognising the possibility of sub-cultures with potentially different attitudes to and perceptions of sustainability the proposed framework is located in the 'differentiation' stream of culture research (Martin 2015; Martin, Frost, and O'Neill 2006).

The visible/invisible dichotomy in instantiations of cultural phenomena is reflected in a related debate about whether or not *culture* is something that organizations ***are*** or ***have***. Previous scholarship has differentiated and separated these perspectives, and the roots of the separation lie in the distinct disciplinary ontologies relating to culture: the anthropological perspective (organizations ***are*** cultures) and a sociological perspective (organizations ***have*** cultures) (Cameron and Quinn 2011).

Both the ***visible/invisible*** and the ***are/have*** dimensions have significant implications for issues of methodology. The advantage of quantitative approaches is that they make a fuzzy field more accessible on a range of pre-determined salient factors and for promoting generalizability – the organizations ***have*** culture dimension. However, quantitative approaches can be criticised for failing to uncover and elaborate those deeper, underlying, hidden aspects of culture that may be idiosyncratic to organizations (the ***are*** dimension) and for which qualitative approaches and their resultant *thick descriptions* (Geertz 1973) are more apposite (Smircich 1983; Cooke and Szumal 1993). As Kwan and Walker (2004: 22) note:

> From the ***is*** (***are***) perspective, each organizational culture is unique and only qualitative methods can fully account for this uniqueness […] the ***has*** (***have***) perspective considers culture as an organizational variable and that it can influence or be influenced by other variables within organizations. (a*uthors' emphasis*)

By integrating the ***are*** and ***have*** perspectives it is possible to interrogate the different layers of organizational culture and to begin to map the trickle-down that initiatives at the visible and influenceable *artefact* layer have at the more opaque and less accessible *basic assumptions* level. Consequently, the article's approach looks to combine both quantitative and qualitative methods, the former to focus on the artefacts of culture – the 'visible products' of the organization (Schein 1997) examples of which can include curricula, formal policies, office arrangements, architecture, documentation, language, technology employed, activities and so forth. The latter looks at *basic assumptions,* root metaphors, stories, symbols and rituals that are implicit and unconsciously guide individual and collective behaviour. This has implications for monitoring the progress for embedding a sustainability culture, suggesting an approach, like organizational culture itself, and working at two levels: a quantitative (survey) approach to tap into the observable aspects of culture and a qualitative (observational/ethnographic) approach to tap into subconscious aspects.

Culture is, in short, the aggregate of people's beliefs, values, customs and norms to the extent that it regulates their behaviour in an organization: to paraphrase Bob Diamond[9], it is how you behave when no-one is looking.

This raises questions about what kind of culture enhances/promotes sustainability in a university. This can be conceived as one in which members and stakeholders hold in common a set of assumptions, beliefs and values and behave in a way reflecting a commitment to operate in a manner consistent with the sustainability principles of balancing economic efficiency, social equity and environmental accountability (after Bertels, Papania, and Papania 2010; Bartell 2003): sustainability culture is based upon the supportive integration of the organization's mission, values, goals and strategy (Galpin, Whitttington, Bell *et al.*, 2015) and expressed in more or less visible ways, it promotes the values of sustainability such as openness and transparency.

Consequently, organizations not built with sustainability values can transform their core ideology and change their organizational culture over time through the manipulation of cultural artefacts so as to incorporate sustainability into the company ethos (Crittenden *et al.*, 2011).

[9] Former Chief Executive of Barclays, see http://news.bbc.co.uk/today/hi/today/newsid_9630000/9630673.stm, accessed July 14, 2015

Based on the previous developing a sustainability culture can be conceived as a process of organizational change…

- … requiring change in culture across diverse groups…
- … composed of visible and invisible elements…
- …in which the visible elements are manageable and accessible via quantitative research methods…
- …and invisible elements less amenable to management intervention, change slowly over time in response to changes at the visible level and observable only through rich insights derived from a qualitative approach (see figure 1).

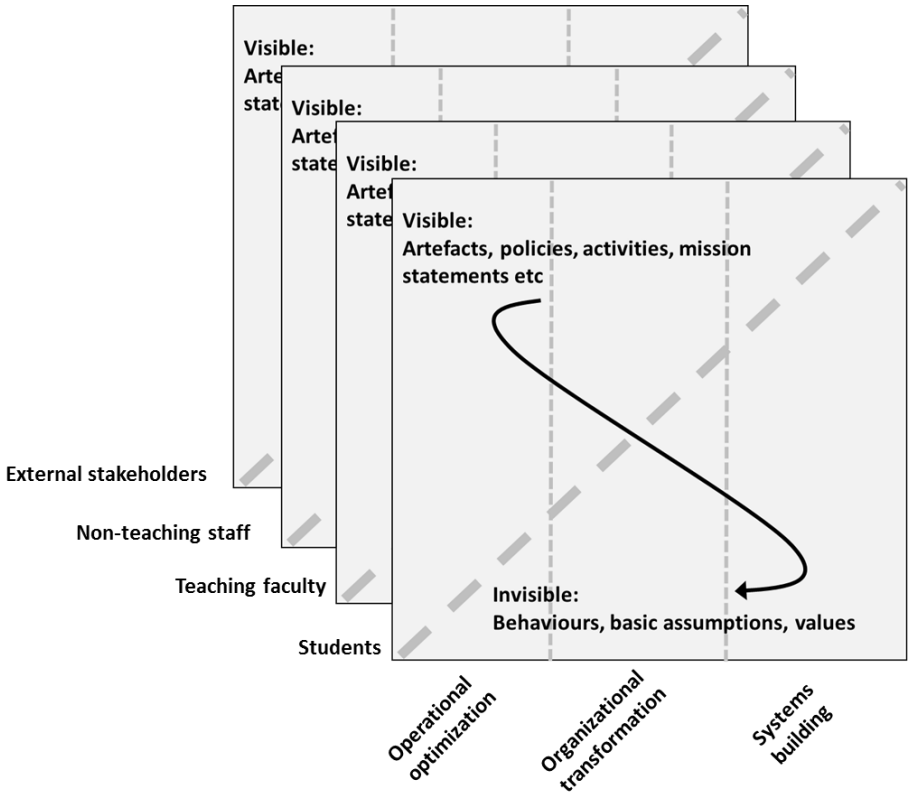

Figure 1: Sustainability culture conceptual framework

4. APPLYING THE FRAMEWORK: THE CASE OF UNIVERSITY OF WORCESTER

The University of Worcester (UW) is ambitious to foster a culture that values sustainability and has a long-standing commitment to act in a sustainable and environmentally responsible manner. Its first Sustainability Policy was adopted in 2007, is reviewed annually and remains a core value, 'promoting the principles of sustainability through teaching, research and knowledge exchange activities…and to promote sustainable communities, services and businesses and foster a culture that values sustainability in arts and culture, and to promote social enterprise in the region' (UW, 2016).

UW's sustainability strategy currently identifies 12 key areas of policy comprising of initiatives ranging from the technical to the behavioural and designed either to mitigate negative impacts or provide positive programmes to impact various stakeholder communities (see Box 2).

Box 2: UW's areas of sustainability policy (UW, 2016)

Biodiversity:
Enhance biodiversity and incorporate biodiversity in environmental management, creating new opportunities for wildlife on campus wherever possible

Community involvement:
Promote communication with internal and external interested parties and respond appropriately to reasonable requests for information about our environmental performance

Construction & refurbishment:
Ensure sustainable approaches in all construction and refurbishment and incorporate energy efficient approaches in all work

Education for sustainability:
Embed inclusion of sustainability principles in the curriculum and support research in relevant areas

Prevent pollution:
By reducing emissions and discharges and regularly reviewing practice against benchmarks

Reduce energy use:
Recognise the potential impact of climate change and the strategic and operational need to control, manage and reduce carbon dioxide and other greenhouse gas emissions; Comply with all relevant environmental legislation, regulations and requirement

Food:
We recognise that it is our responsibility to encourage our suppliers and contractors to minimise negative environmental and social effects associated with the products and services they provide. We will also strive to ensure that local and smaller suppliers are not discriminated against in the procurement process and specifications, within the parameters of our overall purchasing strategy.

Health & wellbeing:
Provide appropriate environmental training for all our staff and students and encourage them to support the EMS Incorporate environmental responsibility in all staff job descriptions

Procurement:
Encourage environmentally responsible procurement and employ whole-life costing and environmental performance criteria for selection

Transport (incl. Transport-fleet and business travel):
Encourage environmentally-friendly transport and implement a Sustainable Transport/Green Travel Plan

Waste management:
Re-use resources whenever possible rather than dispose of them; Encourage the use of recycled materials and recycling initiatives; Comply with all relevant environmental legislation, regulations and requirements

Water:
Reduce our use of water

UW has made progress in delivering on this agenda, implementing a wide range of sustainability-related initiatives against these strategic areas, some of which are mapped against the culture framework in appendix. As a result, the university has risen from 93rd in the People and Planet League 2007 to top 5 by 2016[10]. Specific examples of UW's sustainability initiatives include; ongoing investment in retrofit LED lighting; implementing all the recommendations from a water audit such as changing toilets to low flush and installing reduced flow rate showers in halls of residence;

[10] See https://peopleandplanet.org/university-league

pursuing external validation and certification, in May 2010 UW became the first in England to achieve the EcoCampus Platinum Award for the whole campus; the launch of New Midlands Sustainability Network at the University of Worcester to leverage local network effects; Student Ambassadors, role models trained by the University's Communications team to support a variety of on and off campus activities; and, the ongoing *Energise Worcester* project in which students are trained as advocates for adopting pro-environmental behaviour in off-campus accommodation through the cascading effects of peer-to-peer support (Jacobs 2002).

Consequently, there is significant empirical evidence (see also appendix) of UW having and continuing to introduce operational and technical initiatives in support of sustainability. For several years, UW has been surveying student and staff awareness and attitudes to its sustainability policy and diverse initiatives. Figure 2 presents the percentage of staff and student respondents fully aware of the university's sustainability initiatives, and is aggregated from responses to items relating to 10 separate initiatives[11].The data illustrate that only approximately half the staff and one-quarter of the student population report being fully aware.

In a recent evaluation of UW's participation in the Green Academy organizational change programme (launched in 2011 by the UK's Higher Education Academy), it was recommended that UW "needed to take a more radical and holistic institutional approach" (McCoshan and Martin 2012, 26). The question posed is 'where next?': how can the progress achieved thus far be maintained and more deeply embedded in the DNA of the university?

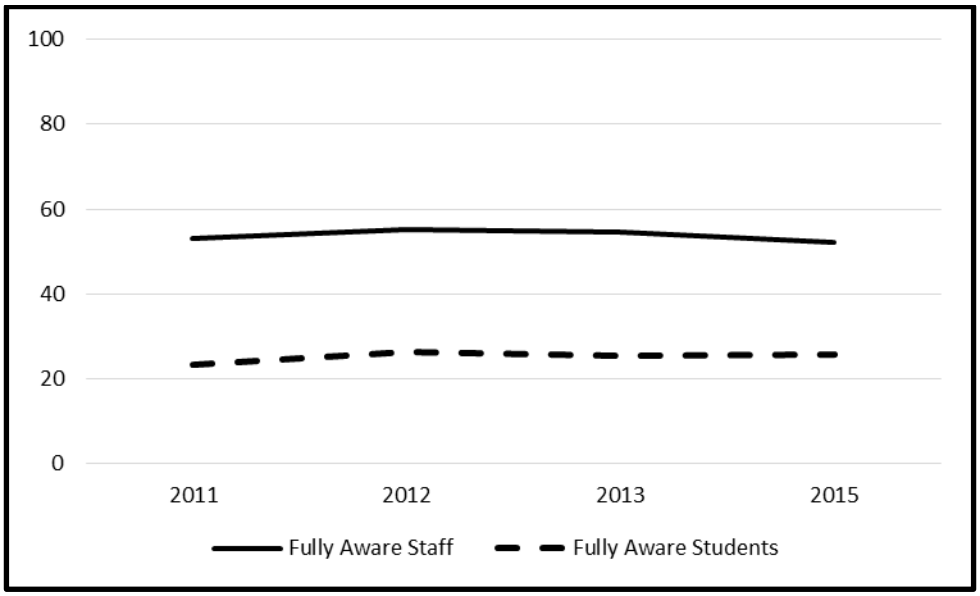

Figure 2: Faculty and student awareness of sustainability initiatives at University of Worcester

Figure 2 therefore raises two important questions. First, what accounts for the gap between student and staff levels of awareness (approximately 25% versus approximately 53%, respectively)? Second, why, despite activity levels and the range of initiatives do these values remain stubbornly static over the period? That is, if, as has been argued earlier, culture is 'the way we do things round here', do these data indicate that a sustainability culture at UW remains yet to be embedded?

These survey data suggest that significant challenges remain in developing a sustainability culture at UW, but how typical is UW's experience? At the University of Michigan (UoM), Marans, Callewaert,

[11] Note: The survey was not run in 2014

and Shriberg (2015) have reported successfully making operational and technical changes but similarly failing to embed a culture of sustainability.

Since 2012 the UoM has been monitoring student, staff & faculty awareness of that university's efforts around key sustainability initiatives (climate action, waste reduction and healthy environments). Although not yet directly comparable, the respective surveys of UW and UoM are becoming increasingly aligned. For example, through a Fulbright exchange program UW and the UoM are collaborating on programmes for assessing campus sustainability cultural information. Figure 3 presents standardised data relating to items investigating awareness and behaviour at UoM, presented on a 0 to 10 scale (Marans, Callewaert and Webster, 2016).

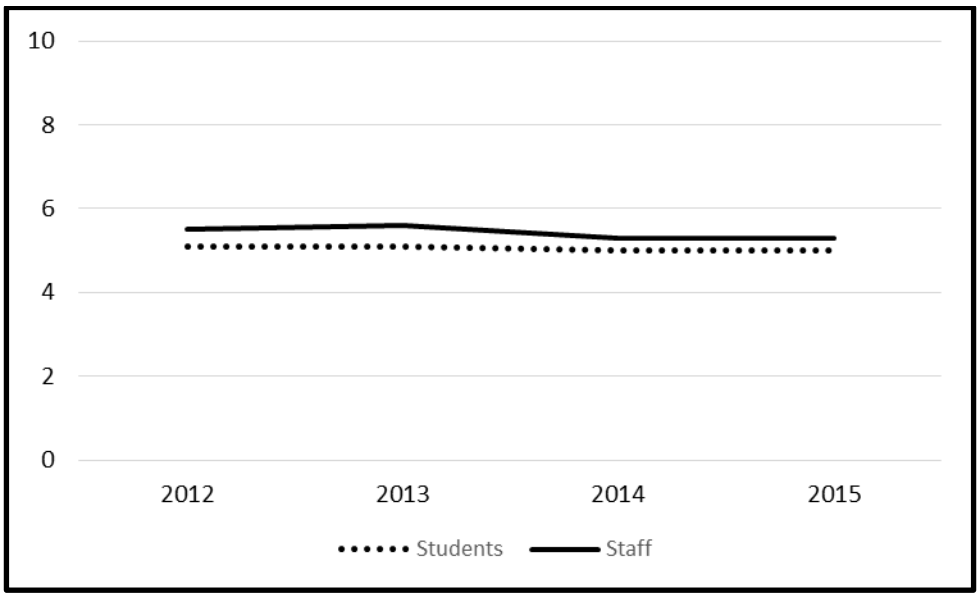

Figure 3: Staff and student behaviours and awareness of sustainability initiatives at University of Michigan (Source: Professor RW Marans, with permission)

Unlike in the case of UW, awareness and behaviour of students and staff at UoM display broadly equivalent levels but, as in the case of UW, stubbornly remain unimproved over time.

5. DISCUSSION

A sustainable university requires individuals who behave sustainably: autonomous, self-regulating and responsible. It is a place where behaviours (as expressed in the university's vision) are regarded amongst all stakeholders as desirable qualities and are promoted as such (after Du Gay and Salaman, 1992). Paraphrasing Peters and Waterman (1982), if an organization has an appropriate culture of sustainability, its members and stakeholders will adopt a sustainable relation to self and these will translate to the organizational level.

As discussed, the notion of organizational culture implies a set of shared goals and values held in common by organizational members which inspire and motivate consistent behaviours. Policies and initiatives have expressive significance: they help define desired modes of behaviour. The question remains as to the extent to which these have been inculcated as shared norms at UW, reflective of a set of community shared values. The truth is that there is a dynamic process at play in which values (read culture) and expressive functions such as policies and initiatives shape and are shaped by each other. Evidently, there is great commitment to the sustainability journey from a number of students and staff at UW and the university's existing sustainability culture is rooted in these tangible, 'expressive functions'.

However, students' low and staff members' stubbornly persistent levels of awareness suggests a failure of enculturation. It has been noted in other types of organization, specifically High Reliability Organizations (e.g. nuclear power stations, air traffic control and submarines that are oriented toward averting disaster) have embedded powerful processes of enculturation that emphasise the high reliability outcome (Weick, 1987). But universities are a particular case, characterised by transient populations of students some (many?) of whom joining as freshmen may be, due to previous life experiences, unfamiliar with the desired behaviours. Is it the case that students arrive at UW lacking a general awareness of sustainability issues, and so require bringing up to speed? Or, do they arrive 'sustainability literate' but fail for some reason(s) to become fully engaged with UW practice?

Shedding some light on this question are reviews of UW's students' attitudes toward and behaviour relating to the use of smart energy metering. Braconnier, Goddard, Puckett *et al*. (2016) and Healy, Libby, Sudol *et a*l. (2017) note a gap between attitude and behaviour: students endorse the idea of smart meter use to manage and conserve energy, but frequently fail to convert attitude into action.

The idea that people's behaviours do not always align with their professed attitudes is not new: this is the difference between theory in use and espoused theory (Argyris and Schön, 1978). The latter refers to the cognitive models that people suggest underpin their behaviours, but frequently, and manifestly, a gap between attitude and behaviour is apparent.

This distinction resonates with Schein's decomposition of culture into artefacts, espoused values and, assumptions: or, as is framed in the proposed conceptualisation, the visible and invisible. Previous research on these mental models has argued that change fails to occur because the target is in "conflict with deeply held internal images of how the world works" (Senge, 1992: 5). But, in the case of UW's sustainability initiatives there would appear to be consonance between most people's espoused theories and desired behaviours and practices: yet still they remain hard to reach.

Solutions to this paradox require more work: one reason may be that the desired behaviours remain too difficult for people to enact, that there are infrastructural or image or cost or other factors that prevent them from being realised. As Healy *et al*'s (2017) evaluation concluded, there are potentially three complicating factors hindering the uptake of smart heating controls: insufficient levels of student motivation to improve energy efficiency, the apparent absence of fuel poverty in the population studied, and concerns regarding privacy.

The evidence of UW's and UoM's surveys suggests that, as others have found (e.g. Dlouhá, Glavič, and Barton (2017)), progress toward establishing a sustainability culture remains sluggish. But, this is the nature of culture change, and the challenge remains of having a clear conceptualisation of what a culture for sustainability in the university sector actually means, how to implement one and how to monitor its development (Verhulst and Lambrechts 2014). Adopting a cultural framework approach will prove helpful for researchers and stakeholders to move beyond a piecemeal and technically-oriented approach to the challenge of university sustainability.

Tierney (1988) was amongst the first to apply the notion of culture to the university sector and outlines a set of *essential concepts* that would constitute a framework of organizational culture in a university: environment, mission, socialisation, information, strategy and, leadership. Since then, culture has been operationalised in a range of aspects of university activity such as, for example, management approaches (Sporn 1996), leadership (Asmawi, Zakaria, and Wei 2013) and internationalisation (Bartell 2003). The concept has, too, been applied to provide insight into the sustainability journeys of universities (Disterheft, Caeiro, Azeiteiro *et al.*, 2015; Ferrer-Balas, Buckland & de Mingo 2009; Isaksson, Johnson & Garvare 2013; Lozano 2006).

Consequently, the proposed framework joins an existing collection designed to enable the implementation of university sustainability as well as to monitor and evaluate progress. It is though, to the best of the authors' knowledge, the only one that explicitly integrates contemporary thinking

on the systemic dimension of sustainability with important factors drawn from cultural change theory. For example, The Association for the Advancement of Sustainability in Higher Education's Sustainability Tracking, Assessment & Rating System (STARS™) is a benchmarking tool designed to enable colleges and universities to gauge their progress toward sustainability (AASHE 2014), but fails explicitly to address the question of culture. The Assessment Instrument for Sustainability in Higher Education (AISHE) (Roorda, Rammel, Waara *et al.*, 2009) shares similar ambitions, but again fails to provide any mechanism directly to map the development of a culture for sustainability. Previously, Shriberg (2002) reviewed 11 such instruments and frameworks, and concluded them to be limited to operational eco-efficiency, tending to measure "what" campuses are doing and "how" they are doing it. The "why", the motivational cultural aspects which are frequently a neglected dimension (Boyko, Gaterell, Barber *et al.,* 2012), is captured in the proposed approach.

Consequently, one contribution is in providing a conceptualisation of university sustainability culture that integrates findings from both the sustainability and cultural change literatures and describes in more fine-grained detail than previously, more aspects of the transformation journey. The benefits of the conceptual framework reside in helping researchers and stakeholders move beyond the technical and piecemeal approaches that have been identified as limitations of previous efforts.

Cultural change will be reflected in and triggered by changes in individual behaviour. To continue to promote this, sustainability and the university's incentivisation and reward systems should be closely aligned (Freeland, 1992): in their absence, existing configurations can act as a barrier (Trencher *et al.*, 2014). If the desired behaviours are not incentivised they are likely not to be realised: if they are mandated by bureaucracy or regulation, only the minimal performance levels are likely to be realised (Du Gay and Salaman, 1992). If members are coerced to implement practices with a low cultural fit this can result in the mutual adaptation of the practices and organizational culture, possibly diluting the impact of either or both (Canato, Ravasi & Phillips, 2013).

Such prescriptions direct attention toward the less quantifiable indicators of cultural change, and more subjectively understood, like emotional, psychological, and social transformations. The progress of change can be assessed through changes in individual's behaviour, stakeholder feedback and, in the tangible and intangible artefacts of culture through which and in which the desired sustainability ends are expressed, delineated, normalised and instrumentalised (Du Gay and Salaman, 1992). In 2012, for example, UW opened the first joint public and university library in Europe. It is an exemplar of systemic reach in cultural transformation because of its outstanding environmental performance and for its social engagement with the wider local community and community groups. Evaluating the impact of such initiatives requires the investigator tries to become a "native" (Cameron and Quinn 2011) and collect data through observation of and participation in cultural and social processes, as well as in-depth interviews (Schensul 2009).

6. CONCLUSION

This study expands the boundaries of research in the field of organizational transformations toward sustainability in the context of HEIs. The article brings together the literature on journeys to sustainability with organizational culture scholarship to propose and apply a conceptual framework to inform the design, implementation and monitoring of initiatives to accelerate embedding cultures for sustainability. Consequently, the article's main contribution is a cognitive framework to support managing the process of organizational change toward sustainability whose application is illustrated with empirical instances drawn from the case of University of Worcester. As such, this work will have implications of significance to university faculty, managers, students and wider stakeholder groups as well as scholars invested in the sustainability agenda.

This article has argued that an organizational culture of sustainability develops over time because of actions applied in the 'visible' layer and is likely manifest in different forms within sub-cultures. It is further argued that to fully understand an organizational culture a mixed-methods research

approach is required that combines quantitative elements to access its visible artefacts and a qualitative approach to unearth and track change in the underpinning basic assumptions and values.

As noted in the UN's recent *Shaping the future we want* report, the tendency to date has been to measure inputs such as technologies, changes in curricula and policy into the sustainable transformation process. It has been difficult to assess whether or not these have led to significant attainments in learning or behaviour change within institutions, communities or at the macro level. The concept of culture provides a lens through which this knowledge gap can be explored. The conceptual framework outlined here is a step towards progress in this direction. It remains a work-in-progress with much still to be done. The process and progress of this initiative will be closely monitored with findings contributing to the development of further in-depth cases of transformation to HEI Sustainability as well as to developing better understanding of how organizational cultures and climates are shaped and reshaped as members of the organization address sustainability issues.

Making culture visible in this way can help universities achieve their sustainability ambitions and to narrow the gap between publicly espoused values and organizational behaviour and so improve their social legitimacy.

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8. APPENDIX: UNIVERSITY OF WORCESTER SUSTAINABILITY POLICY AREAS, ILLUSTRATIVE INITIATIVES AND METRICS. SOURCE: UW (2016), BOOM (2017).

Biodiversity	
Indicative activities and initiatives	**Indicative measures (not exhaustive)**
Operational optimization » Collaborate with Nature Society; » Malvern Meadow - native wildflower planting; » University allotment on campus **Organizational transformation** n/a **Systems building** n/a	» Map St John's Campus in detail for land use by August 2017 » Implement all detailed actions as set out in the Biodiversity Action plan

Community involvement	
Indicative activities and initiatives	**Indicative measures (not exhaustive)**

Operational optimization » Wychavon Intelligently Green Awards - for school children **Organizational transformation** » Susthingsout.com and front facing website **Systems building** » Go Green Week in the Community; » Energize Worcester; » Skills for Tomorrow - local business involvement; » Midlands Sustainable Further and Higher Education Network - Emerging Leaders programme	» Increase student sign-up to participation in SSO by 10% on 2011/12 levels » Work closely with and support student groups such as People and Planet, Nature Society to raise awareness on environmental issues » To use press evaluation and Google analytics to measure awareness of the University's sustainability drive in the local community and within the higher education sector. To inform possible target setting for community awareness » Promote collaborative working within UW and with Worcestershire and Worcester City Council and other 3rd sector organizations.

Construction & refurbishment	
Indicative activities and initiatives	**Indicative measures (not exhaustive)**
Operational optimization » Implementing new refurbishment sustainability standard SKA for Art House Refurbishment, going for Higher Standard - Gold **Organizational transformation** n/a **Systems building** n/a	» All new build projects should be designed to achieve a DEC B rating or above » Ensure the 'Halving Waste to Landfill' clauses is included in all building and refurbishment contracts for consultants and contractor » BREEAM assessment to be carried out on all new buildings of over 1000m2 with a target to achieve a rating of 'Excellent' but with a minimum rating of 'Very Good' in cases where there are good and explicit reasons why an excellent rating could not be achieved

Education for sustainability	
Indicative activities and initiatives	**Indicative measures (not exhaustive)**
Operational optimization » Collaborate with Nature Society; » Malvern Meadow - native wildflower planting; » University allotment on campus **Organizational transformation** » Go Green Week and sustainability elective; » Learning for Sustainable Futures **Systems building** » Skills for Tomorrow; » Susthingsout.com	» Retain Responsible Futures accreditation, and increase score from 234 to 250 at next reaccreditation » Monitor, evaluate and disseminate the impact of innovative teaching model for the electives, to inform new electives/degrees for 2017

Prevent pollution	
Indicative activities and initiatives	**Indicative measures (not exhaustive)**
Operational optimization » Emergency Hazardous Materials Spill drill; » Development of in-house training materials **Organizational transformation** n/a **Systems building** n/a	» Reduce fugitive F Gas emission by 25% annually from a baseline 2013-14 of 18.25t CO_2e » Do additional promotion of pollution awareness-raising and with new facilities staff by May 2016

Reduce energy use	
Indicative activities and initiatives	**Indicative measures (not exhaustive)**
Operational optimization Energy Management Student Placement - comparing and contrasting University data with other Universities **Organizational transformation** »Student Switch Off; »Green Impact **Systems building** Energize Worcester: http://energize-worcester.co.uk/	» 5% p.a. reduction GHGe emissions in energy against a 2008/9 baseline from 2010 to 2020. Consumption targets » 6% reduction in kWh gas consumption from 2015-2016 » Increase renewable energy generation to 2% of total consumption by 2020 » Create an energy action plan for all University significant buildings to improve the DEC to target levels.

Food	
Indicative activities and initiatives	**Indicative measures (not exhaustive)**
Operational optimization » Fair Trade; » Drinking Water fountain map of campus; » University allotment **Organizational transformation** » Green Impact; » On campus open pizza oven for student and community use **Systems building** » Go Green Week - food day	» Obtain Sustainable Restaurant Association certification » Minimise food waste and comply with the University's separate food waste collection service and provide facilities for recycling and disposing of plate waste » Promote part-time Carnivore campaigns

Health & wellbeing	
Indicative activities and initiatives	**Indicative measures (not exhaustive)**
Operational optimization » Every other one - water; » University Mile **Organizational transformation** » Fit-4-Life; » Green Impact **Systems building** n/a	» Achieve level 3 standard by August 2017 » A full set of qualitative targets with completion dates have been agreed for H&W by signing up to the Worcestershire Works Well framework.

Procurement	
Indicative activities and initiatives	**Indicative measures (not exhaustive)**
Operational optimization » Supplier Engagement days; » Engagement of Management Students in ethical procurement practices and workers' rights workshops **Organizational transformation** n/a **Systems building** n/a	» Reduce the carbon emissions attributed to contracts the University is able to influence by 5% from 2011-12 baseline by 2018 » Implement Net Positive tool kit for supplier reporting

Transport (incl. Transport-fleet and business travel)	
Indicative activities and initiatives	**Indicative measures (not exhaustive)**
Operational optimization » Bike Loan Scheme; » Car share; » Cycle to work; » Subsidised Bus Tickets **Organizational transformation** » Testing innovative bike stack racks to introduce for staff **Systems building** n/a	» 25% reduction absolute tCO2e emissions from staff and students' commuting to University on a daily basis by 2020 from a baseline 2010/11 of 6,843 tCO2e » 5% reduction in the tC02e emissions from travel between students' homes and the University by 2018 from a baseline 2010/11 of 2,891 tCO2e » 20% reduction in the percentage of staff travelling by car alone to work by 2018 - i.e. a reduction from 55% in 2012 to 44% by 2018 » Develop department pool bike pilot scheme, whereby departments have access to a bikes for intersite travel.

Waste management	
Indicative activities and initiatives	**Indicative measures (not exhaustive)**
Operational optimization » Student led food bank collections - end of semester; » BHF collections on move out **Organizational transformation** » White Bags project with City Council **Systems building** n/a	» Reduce waste collection weight by 3% per annum from baseline 2015-6 from 2017-2020. » Further promote local re-use services, such as Repair Café, BorroClub and groups to the university community » Implement pilot Green Impact Excellence project with office cleaning staff; to increase office recycling rates amongst staff and increase education and understanding amongst cleaners. Extend across campus if successful.

Water	
Indicative activities and initiatives	**Indicative measures (not exhaustive)**
Operational optimization In discussion with Neopearl to introduce retro fit flow rate adaptors for staff and student use. **Organizational transformation** n/a **Systems building** n/a	» 2.5% p.a. reduction in water GHGe emissions from consumption against a 2012-13 baseline from 2014 to 2019 » All rain water harvesting installed on halls of residence to be fully functional and recorded by March 2017 » Main meters to be fully functional on pulsed outputs and recorded on a M&T. Enable a M&T system to establish a water leak detection programme by July 2017

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